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The Control Attitudes Scale-Revised: Psychometric Evaluation in Three Groups of Patients With Cardiac Illness

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Abstract

Background: Perceived control is a construct with important theoretical and clinical implications for healthcare providers, yet practical application of the construct in research and clinical practice awaits development of an easily administered instrument to measure perceived control with evidence of reliability and validity.

Objective: To test the psychometric properties of the Control Attitudes Scale-Revised (CAS-R) using a sample of 3,396 individuals with coronary heart disease, 513 patients with acute myocardial infarction, and 146 patients with heart failure.

Methods: Analyses were done separately in each patient group. Reliability was assessed using Cronbach's alpha to determine internal consistency, and item homogeneity was assessed using item-total and interitem correlations. Validity was examined using principal component analysis and testing hypotheses about known associations.

Results: Cronbach's alpha values for the CAS-R in patients with coronary heart disease, acute myocardial infarction, and heart failure were all greater than .70. Item-total and interitem correlation coefficients for all items were acceptable in the groups. In factor analyses, the same single factor was extracted in all groups, and all items were loaded moderately or strongly to the factor in each group. As hypothesized in the final construct validity test, in all groups, patients with higher levels of perceived control had less depression and less anxiety compared with those of patients who had lower levels of perceived control.

Conclusion: This study provides evidence of the reliability and validity of the 8-item CAS-R as a measure of perceived control in patients with cardiac illness and provides important insight into a key patient construct.

Keywords

acute coronary syndrome, acute myocardial infarction, heart failure, instrument, perceived control, reliability, validity

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The Control Attitudes Scale-Revised: Psychometric Evaluation in Three Groups of Cardiac Patients

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Abstract

Background—Perceived control is a construct with important theoretical and clinical implications for healthcare providers, yet practical application of the construct in research and clinical practice awaits development of an easily administered instrument to measure perceived control with evidence of reliability and validity.

Objective—To test the psychometric properties of the Control Attitudes Scale-Revised using a sample of 3,396 individuals with coronary heart disease (CHD), 513 acute myocardial infarction (AMI) patients, and 146 patients with heart failure (HF).

Methods—Analyses were done separately in each patient group. Reliability was assessed using Cronbach's alpha to determine internal consistency, and item homogeneity was assessed using item-total correlations, and interitem correlations. Validity was examined using principal component analysis and testing hypotheses about known associations.

Results—Cronbach's alphas for the CAS-R in patients with CHD, AMI, and HF were all greater than .70. Item–total correlation coefficients and interitem correlation coefficients for all items were acceptable in the groups. In factor analyses, the same single factor was extracted in all groups, and

all items were loaded moderately or strongly to the factor in each group. As hypothesized in the final construct validity test, in all groups, patients with higher levels of perceived control had less depression and less anxiety compared with patients who had lower levels of perceived control.

Conclusion—This study provided evidence of the reliability and validity of the 8-item CAS-R as a measure of perceived control in cardiac patients and provides important insight into a key patient construct.

Keywords

instrument; reliability; validity; heart failure; acute coronary syndrome; acute myocardial infarction; perceived control

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Perceived control is an individual's belief that he or she has the resources required to cope with negative events in a way that positively influences their adversive nature (Moser & Dracup, 1995; Thompson, Sobolew-Shubin, Galbraith, Schwankovsky, & Cruzen, 1993). Higher levels of perceived control are associated with lower levels of psychological distress. A number of investigators have demonstrated that anxiety and depression levels are substantially higher and quality of life lower in individuals with low levels of perceived control (Ballash, Pemble, Usui, Buckley, & Woodruff-Borden, 2006; Donovan, Hartenbach, & Method, 2005; Evangelista, Moser, Dracup, Doering, & Kobashigawa, 2004; Thuen & Rise, 2006). Although thought to be a personality characteristic, perceived control is not immutable and can be increased by intervention, the most common of which is education and counseling (Moser & Dracup, 2000; Olajos-Clow, Costello, & Lougheed, 2005). Thus, perceived control is an appropriate topic for nursing and other healthcare researchers, particularly in patient groups with a chronic illness who require a high degree of self-management. As the number of individuals with chronic illnesses increase dramatically worldwide (Strong, Mathers, Leeder, & Beaglehole, 2005), it is particularly important for nurses to understand how to improve their adaptation.

The phenomenon of perceived control is important to clinicians caring for patients with chronic illnesses for a number of reasons. First, perceived control is a construct fundamental to nursing and behavioral science and clinical practice. Many interventions, such as education and the provision of information, have at their foundation the goal of increasing perceptions of control in order to improve patients' emotional adjustment and clinical outcomes (Johnston, Gilbert, Partridge, & Collins, 1992; Moser & Dracup, 2000; Skinner, 1996; Thompson et al., 1993). Second, perceived control moderates the negative impact of emotional distress on clinical outcomes such as post-myocardial infarction complications including recurrent ischemia, reinfarction and malignant dysrhythmias (Moser et al., 2007). Third, despite the importance of perceived control, this mechanism has not been elucidated clearly in many interventions, possibly due to lack of an instrument capable of capturing the construct.

The construct of perceived control is particularly relevant to patients with cardiovascular disease. Besides being the number one killer of Americans, coronary heart disease (CHD) is highly prevalent; more than 13 million people have CHD in the United States alone (Rosamond et al., 2007). Of these, more than 7 million are survivors of an acute myocardial infarction (AMI) and it is estimated that 1.2 million will suffer a new or recurrent AMI each year (Rosamond et al., 2007). Other cardiac conditions are equally prevalent. For example, more than 5 million Americans have heart failure (Rosamond et al., 2007).

Quality of life, adaptation to the chronicity of cardiac disease and psychosocial recovery from acute cardiac events depends more on psychological than on physical factors (Heo, Moser, Riegel, Hall, & Christman, 2005; Moser & Dracup, 1995). A fundamental construct predicting how successfully patients adapt to cardiovascular conditions is perceived control (Johnson & Morse, 1990). Practical application of the construct in research and clinical practice awaits

development of an easily administered, instrument that has evidence of reliability and validity. Accordingly, the purpose of this study was to obtain psychometric support for the Control Attitudes Scale-Revised (CAS-R). The research hypotheses were that the instrument would show evidence of (a) quality of item distributions and their contribution to the scale; (b) internal consistency reliability; and (c) construct validity.

Background

The work of Bailis, Segall, Mahon, Chipperfield, and Dunn (2001) provides the theoretical framework whereby greater levels of perceived control are related to better physical and mental health outcomes. Building on decades of work suggesting this relationship, they proposed that perceived control was the mechanism that mediated the association between socioeconomic status and health (Bailis et al., 2001). They tested this framework in more than 11,000 Canadians, and demonstrated support for their hypothesis.

Identification of individuals most likely to suffer persistent psychosocial distress after a cardiac event permits healthcare providers to target high-risk patients for intervention. Investigators have demonstrated that factors such as anxiety and depression, identified early after a cardiac event, can be predictive of psychosocial adaptation in the long term (Kulik & Mahler, 1993; Lane, Carroll, Ring, Beevers, & Lip, 2001). Perceived control is another predictive factor that can influence psychosocial adaptation (Dracup et al., 2003; Moser & Dracup, 1995, 2004). Even in patients with advanced or terminal illnesses, perceived control is associated with better psychosocial adjustment. Higher perceptions of personal control have been found to affect patients' responses to stressful situations such that cortisol levels are reduced and immune function is improved (Bollini, Walker, Hamann, & Kestler, 2004; Griffin & Chen, 2006).

Specific evidence of the positive role that perceived control plays in patient outcomes is available from a variety of patient populations. Cardiac rehabilitation patients, or those with diabetes, hypertension, and alcohol addiction who have increased perceptions of control all have greater adherence to recommended therapy than those with lower perceptions of control (Pfeiffer & Walker, 1990; Seeman & Lewis, 1995). Patients recovering from stroke and coronary artery bypass surgery have better physical outcomes when they have greater perceptions of control (Anderson, 1987; Partridge & Johnston, 1989). Perceived control attenuates pain and anxiety related to the pain experience (Wiech et al., 2006). Perceived control is a mechanism by which posttraumatic stress disorder symptomatology and pain severity are associated with psychosocial and physical impairment (Paylo & Beck, 2005). Low perceived control in daily life is associated with carotid atherosclerotic progression in healthy men (Kamarck, Muldoon, Shiffman, & Sutton-Tyrrell, 2007). This wide range of evidence about the role of perceived control in health underscores its importance as a construct of interest for healthcare providers and health researchers.

Among patients with cardiac disease, there is evidence that perceived control plays a vital role in determining adaptation. After AMI or coronary revascularization, level of perceived control is independently predictive of psychosocial recovery and plays a more prominent role than physical predictors such as the New York Heart Association (NYHA) functional class in determining psychosocial recovery (Moser & Dracup, 1995). Perceived control is correlated negatively with dysphoria in that higher levels of perceived control are associated with lower levels of anxiety and depression in a variety of cardiac populations and their families (Dracup et al., 2003; Evangelista et al., 2004; Moser & Dracup, 2000, 2004). Perceived control can be enhanced by educational interventions that provide people with the skills they need to cope with potential and actual threats (Moser & Dracup, 2000). Additionally, perceived control can moderate the negative impact of anxiety on in-hospital complication such as recurrent ischemia, reinfarction, and malignant dysrhythmias after AMI (Moser et al., 2007).

In response to the need for an instrument to specifically measure the level of perception of control felt by individuals with cardiac disease, the 4-item Control Attitudes Scale was developed (Moser & Dracup, 1995). This instrument was developed because no instrument existed to measure perceived control in the context of cardiac disease. Use of many of the myriad nondisease-specific instruments to measure control constructs (Skinner, 1996) resulted in inconsistent findings (Mahler & Kulik, 1990).

The 4-item Control Attitudes Scale was developed originally by the investigators based on patient interviews, and had face and content validity. Evidence of construct validity was accumulated over the course of several studies (Moser & Dracup, 1995, 2000). Although the 4-item instrument performed well with evidence of excellent reliability and validity in all types of cardiac patients with family members (Dracup et al., 2003; Moser et al., 2007), its reliability was poor when patients did not have someone they identified as family or a close friend, because two of the four items asked respondents to rate the perceived control of their family members. To make the instrument universally applicable and to improve the instrument's stability, it was combined with a modification of the Rheumatology Attitudes Index, another measure of perceived control specific for rheumatology patients (Callahan, Brooks, & Pincus, 1988). Although the resulting instrument, the Cardiac Attitudes Index, had evidence of reliability and validity, it consisted of 19 items, some of which were redundant. Elimination of redundancies as a result of examination of interitem correlations and examination by experts left an 8-item instrument, the CAS-R. The current study was conducted to test the psychometric properties of the CAS-R.

Methods

Baseline data from three multicenter clinical studies were used in the current report. The first study was a randomized controlled trial of an education and counseling intervention designed to decrease CHD patient delay in seeking treatment for symptoms of acute coronary syndrome (Dracup et al., 2006). The second study was a longitudinal examination of the impact of anxiety on in-hospital complications in AMI patients (Moser et al., 2007). The third was a study of potential physiologic and behavioral mediators linking anxiety and depression with poor outcomes in patients with HF (Wu et al., 2008).

Sample and Setting

Data from three different cardiac samples were included to provide psychometric data relevant to a number of different cardiac populations (Dracup et al., 2006; Moser et al., 2007; Wu et al., 2008). Data from 3,396 patients with CHD, 513 AMI patients, and 146 patients with HF were used in this analysis (Table 1). Patients were included in the CHD sample if they had been given a diagnosis of CHD by a physician, were community dwelling and had no serious complicating comorbidity and no cognitive impairment (Dracup et al., 2006). Patients included in the AMI sample were hospitalized in a cardiac care unit with a diagnosis of AMI confirmed by elevated cardiac enzymes and typical ECG changes, were pain-free and hemodynamically stable at the time they were approached for inclusion in the study, had no cognitive impairment, and had no noncardiac serious or life-threatening comorbidities (Moser et al., 2007). Patients in the HF sample were enrolled if they had a diagnosis of chronic HF confirmed by a cardiologist and had no cognitive impairment, had no co-existing terminal illnesses and had no AMI or stroke within the previous three months (Wu et al., 2008).

Institutional Review Board approval was obtained for the conduct of the studies, and patients gave written informed consent to participate. All participants were recruited after referral to the investigators by nurses and physicians at each site. Data were collected from the CHD and HF patients in the outpatient setting, while data from the AMI patients were collected in the inpatient setting. In each of the studies, data were collected by questionnaire at the baseline

session. In each study, patients had the option of having the instruments read to them by the research assistant or of completing the instruments on their own. There were no differences in scores based on the method of administration. Questionnaires were checked for completeness by the research assistants before the patient left the session.

Measurement

Control Attitudes Scale-Revised—The CAS-R consists of 8 items: 2 items from the original Control Attitudes Scale (i.e., items 7 and 8, Table 2) and 6 items from the Cardiac Attitudes Index (Table 2). The instrument is designed to be completed by the participant, although it also can be read to the subject and completed by an interviewer. The total score can range from 8 to 40; higher scores indicate greater perceived control. The CAS-R is scored by adding the item scores--each item is rated on a scale of from 1 (totally disagree) to 5 (totally agree); ratings on items 5 and 8 are reversed before scoring. This format was selected because in a pilot of the instrument, respondents preferred it to a yes-no format and the Likert response format yielded more psychometrically stable data than the yes-no format. The Likert response format yields more variability in responses which contributes to enhanced internal consistency. The instrument can be completed by most patients in less than 2 minutes. The Flesch-Kincaid reading grade level was between 4th and 5th grade.

Anxiety and depression—To provide evidence of construct validity, the hypotheses that anxiety and depression would be associated with level of perceived control as demonstrated by previous research were tested. Anxiety was measured using the anxiety scale of Brief Symptom Inventory (Derogatis, 1993) or the Multiple Adjective Affect Checklist (Zuckerman & Lubin, 1965), depending on the study from which data were used. Depression was measured using Multiple Adjective Affect Checklist (Zuckerman & Lubin, 1965), or the depression scale of Brief Symptom Inventory.

The anxiety and depression subscales of the Brief Symptom Inventory each consist of 6 items that are rated by the patient on a 5-point scale (0–4) of distress ranging from *not at all* to *extremely*. Item scores are summed and the mean obtained; higher scores indicate higher levels of anxiety or depressive symptoms. Construct, convergent, discriminant, and predictive validity of the Brief Symptom Inventory have been demonstrated in a series of studies (Derogatis, 1993).

The Multiple Affect Adjective Checklist is a self-report instrument used to assess state anxiety and depression (Zuckerman & Lubin, 1965). The instrument consists of 132 positive and negative adjectives associated with these emotions, arranged in alphabetical order. Participants read through the adjectives and check those that reflect how they are feeling currently. Scoring is done by calculating the number of negative adjectives checked and the number of positive adjectives not checked, a method that reduces response bias. Higher scores indicate higher levels of anxiety or depression. The instrument has been used extensively in research and has well-demonstrated sensitivity, reliability, and validity (Zuckerman & Lubin, 1965).

Sociodemographic and clinical variables—For descriptive purposes, data on sociodemographic and clinical variables were collected from patient interview and medical record review.

Data Analysis

Analyses were done separately in each patient group. The quality of the item distributions was assessed through examination of item descriptive statistics. Reliability and validity were assessed as follows.

Reliability—Internal consistency reliability was assessed using Cronbach's alpha; coefficients greater than 0.70 were considered evidence of internal consistency (Streiner & Norman, 2001). To further assess reliability, two item analyses were conducted: (a) item-total correlations (Ferketich, 1991) and (b) interitem correlations (Ferketich, 1991). Item-total and interitem correlations were used to assess the homogeneity of the items. An item-total coefficient of greater than 0.30 provides evidence that the item makes a contribution to the measure. Interitem correlations between 0.30 and 0.70 indicate that items contribute to the measure and are not redundant (Ferketich, 1991).

Validity—Factor analysis was done using principal component analysis. Factors were extracted on the basis of the results of a scree plot, the eigenvalues, total variance, and conceptual consideration in each sample (Pett et al., 2003; Polit & Hungler, 1999). A loading score of greater than .40 was used as a cutting point (Pett, Lackey, & Sullivan, 2003; Polit & Hungler, 1999). Convergent validity was tested by examining the relationships of anxiety and depression with perceived control using regression. Based on prior research demonstrating that anxiety and depression are correlated with perceived control (Dracup et al., 2003; Moser & Dracup, 1995, 2000), a psychometrically sound instrument purporting to assess perceived control should be correlated negatively with anxiety and depression (Bailis et al., 2001). Thus, it was hypothesized that perceived control would be related to anxiety and depression (such that higher levels of perceived control would be associated with lower levels of anxiety and depression) after controlling for sociodemographic variables. This hypothesis was tested using a two-tailed test.

Results

Summary scores for the instruments employed in this study are presented in Table 3. The CAS-R scores were distributed normally in each patient group; normality was assessed by inspection of histograms and formally using the one-sample Kolmogovov-Smirnov test. The Cronbach's alphas for the anxiety and depression scales used in this study in each of the samples were greater than .80.

Item Analyses and Reliability

Cronbach's alphas for the CAS-R in the CHD, AMI, and HF patient sample were .73, .72, and .76, respectively, indicating adequate internal consistency reliability. There was no improvement in the Cronbach's alphas with removal of any of the items so they were all retained. In the item-total correlation analyses, the corrected item-total correlation coefficients of all items in each of the three patient groups were greater than .30 as desired (Table 4). In the interitem correlation analyses, all items in the three groups were related to at least one of the other items with coefficients greater than .30 (indicating that the item contributes to the measure), but less than .70 (indicating no redundancy). Further evidence of the quality of the item distributions can be found in Table 5.

Construct Validity Using Factor Analysis

Initial factor analyses were conducted using principal component analyses with varimax rotation (with Kaiser Normalization), and two factors were extracted in each group. However, scree plots in all groups demonstrated that one factor was appropriate for these data. The eigenvalue for the first component for the HF group was 3.153, for the AMI group was 2.897, and for the CHD group was 2.862. Eigenvalues for the second components in CHD, AMI, and HF group were minimally greater than 1 (1.05, 1.06, and 1.04, respectively). Different items belonged to each factor in each patient group, and each factor in each group failed to show a clear theme. Based on these results, a one-factor analysis using principal component analyses without rotation (Table 6) was conducted, which accounted for 34%, 36%, and 39% of the total

variance in patients with CHD, AMI, and HF, respectively. In each patient group, all items demonstrated moderate or strong loadings (>.40).

Construct Validity Using Hypothesis Testing

To provide further support for construct validity, the hypothesis that perceived control would be related to anxiety and depression was tested using multiple regression, controlling for relevant sociodemographic (i.e., age, gender, education level, marital status) and clinical (i.e., NYHA status [if measured], ejection fraction [if measured], comorbidities) variables. Separate regression models were constructed for anxiety and depression. In each of the three cardiac patient samples, higher levels of perceived control were related independently to lower levels of anxiety and depression (Table 7). These results were consistent even when different instruments were used to measure anxiety and depression.

Discussion

In efforts to develop a psychometrically sound instrument useful to researchers and clinicians, the CAS-R has evolved from the 4-item Control Attitudes Scale (Dracup et al., 2003; Moser & Dracup, 1995, 2000) to the 19-item Cardiac Attitudes Index. The 4-item Control Attitudes Scale was psychometrically strong in cardiac patients who had a family member, while the 19-item Cardiac Attitudes Index was useful in patients with and without family members. The latter had a number of redundant items that were removed to produce the 8-item CAS-R. In the current study, it was demonstrated that the 8-item CAS-R, is a parsimonious instrument with evidence of reliability and validity, that is easy to administer and easy for patients to take and understand.

In this study, tested were the hypotheses that the CAS-R would show evidence of (a) quality of item distributions and contribution to the scale; (b) internal consistency reliability; and (c) construct validity. Examination of the item descriptive statistics in each cardiac group demonstrated the quality of item distributions. The standard deviations indicated that although there was variability in responses among the patients in the sample, the variability was not so great that it rendered the items composing the instrument unreliable. The tight confidence intervals demonstrated that the item means obtained in each of the sample were a good estimation of the population item means. The interitem and item-total correlations demonstrated that each item in the scale contributed to the scale without redundancy. Cronbach's alpha estimations for the CAS-R in each cardiac group were adequate, although at .72–.76 there is room for improvement in internal consistency reliability. In the current study, removal of items did not improve the Cronbach's alpha of the CAS-R so all items were retained. Finally, this study provided evidence of construct validity for the CAS-R. Thus, the CAS-R can be used to measure perceived control in cardiac patients with a variety of diagnoses and living situations.

The stability of the psychometric findings about the CAS-R across three diverse cardiac patient groups and across different measures of anxiety and depression provides strong support for the sound psychometric properties of the instrument. The psychometrics of the instrument were equally robust when it was administered to hospitalized patients and outpatients. Moreover, it performed similarly well in individuals with a diagnosis of CHD and with more advanced degrees of cardiac disease who were suffering an acute event or who had progressed to HF.

Findings from this study further confirm the beneficial effects of perceived control in patients with cardiac disease. In this study, it was demonstrated that perceived control was associated with lower levels of anxiety and depression in all three cardiac patient groups even after controlling for other relevant variables. Thus, despite concerns that perceptions of control in chronic disease states could promote denial, the preponderance of research indicates that

patients with chronic diseases who have higher perceptions of control over the disease process adapt better and have better outcomes than those with low perceptions of control. Perceptions of control related to AMI moderate the negative impact of anxiety on clinical outcomes in hospitalized patients (Moser et al., 2007). The mean scores on the CAS-R in all three cardiac patient samples indicate that, in general, the patients who were tested experienced relatively high perceptions of control. If patients checked *agree* to every statement their score would be 32 and the highest possible score is 40; thus, the means of 28.4 to 30.3 represent relatively high levels of perceived control. This finding demonstrates, similar to the findings of others (Taylor, Helgeson, Reed, & Skokan, 1991), that even patients with chronic diseases of a life-threatening nature still perceive that they have control over their health. This finding also raises some concerns that the instrument may suffer measurement bias from a large ceiling effect and have poor responsiveness. There is little evidence that the CAS-R suffers from this problem, however, as the scores are distributed normally in each of the three groups studied. Furthermore, evidence exists that the instrument is capable of detecting changes in perceived control as a result of several types of intervention tested in randomized, controlled trials (Moser et al., 2005).

Implications for Research and Practice

Perceived control can be increased by interventions that provide patients or their support person with information and skills that help them cope with threatening situations. For example, teaching cardiopulmonary resuscitation (CPR) to family members of cardiac patients resulted in a significant increase in perceived control among the family members (Moser & Dracup, 2000). Similarly, teaching CPR to parents of high-risk neonates resulted in an increase in their sense of perceived control (Moser, Dracup, & Doering, 1999). Nurses wishing to reduce patients' emotional distress by increasing their sense of perceived control can do so by providing them with specific education and skills training directed at the factors they find threatening or of major concern. The CAS-R can be used clinically to measure changes in perceived control.

Future research regarding the CAS-R should concentrate on defining scores that accurately reflect high, low, and medium levels of perceived control. There are no norm references for the CAS-R at this point, but the total score can be used for comparative purposes and for tracking changes across time or after intervention.

Limitations

The CAS-R can be completed by the participant, but also can be read to the subject and completed by the interviewer. This can be viewed as a strength of the instrument because it allows use of the instrument in ill and fatigued patients who might have difficulty completing the instrument without help. On the other hand, the impact of different methods of completing the instrument was not formally assessed. Another limitation of the study is the lack of generalizability with regard to race or ethnicity as most of the sample was White.

Conclusion

The CAS-R is a short, easy to administer, and psychometrically sound instrument that can be used by clinicians and researchers to assess cardiac patients' perceptions of control related to their cardiac condition.

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Table 1

Characteristics of Samples (N = 4,055)

Characteristics	*M* (± SD) or *n* (%)		
	CHD (*n* = 3,396)	MI (*n* = 513)	HF (*n* = 146)
Age (years)	67 (± 11)	62 (± 13)	68 (± 13)
Education (years)		13 (± 3)	12 (± 3)
Some high school	542 (16.0)		
Completed high school	623 (18.3)		
Some college of technical or professional school	1,141 (33.6)		
Completed college or graduate school	950 (27.9)		
Gender (Male)	2,326 (68.5)	345 (67.3)	80 (54.8)
Marital Status			
Married	2,319 (68.3)	358 (69.8)	71 (48.6)
Widowed	441 (13.0)	68 (13.3)	42 (28.8)
Other	636 (18.7)	87 (17.0)	33 (22.6)
Ethnicity			
Caucasian	3,112 (91.6)	437 (85.2)	130 (89.0)
Other	284 (8.4)	76 (14.8)	16 (11.0)
Comorbidities			
Hypertension	1,864 (54.9)	289 (56.3)	103 (70.5)
Previous myocardial infarction	1,825 (53.7)	138 (26.9)	-
Prior PTCA	1,595 (47.0)	84 (16.4)	-
Diabetes mellitus	726 (21.4)	112 (21.8)	69 (47.3)
Lung disease	-	-	29 (19.9)
Stroke	333 (9.8)	-	20 (13.7)
Poor kidney function	-	-	15 (10.3)
Worse pain experienced on a scale from 0 (no pain) to 10 (worse pain ever felt)	-	7.5 (± 2.9)	-
Q-wave myocardial infarction	-	314 (61.2)	-
Non-Q-wave myocardial infarction	-	185 (36.1)	-
Left ventricular ejection fraction, %	-	-	36 (± 15)
Etiology			
Ischemic	-	-	85 (58.2)
Hypertension	-	-	17 (11.6)
Other	-	-	44 (30.1)
New York Heart Association functional class			
I	-	-	3 (2.1)
II	-	-	58 (39.7)
III	-	-	68 (46.6)
IV	-	-	12 (8.2)

Notes. CHD = coronary heart disease, HF = heart failure, MI = myocardial infarction, PTCA = percutaneous transluminal coronary angioplasty

Table 2
The Control Attitudes Scale-Revised

Items	
1	If I do all the right things, I can successfully manage my heart condition.
2	I can do a lot of things myself to cope with my heart condition.
3	When I manage my personal life well, my heart condition does not bother me as much.
4	I have considerable ability to control my symptoms.
5	* No matter what I do, or how hard I try, I just can't seem to get relief from my symptoms.
6	I am coping effectively with my heart condition.
7	Regarding my heart problems, I feel lots of control.
8	* Regarding my heart problems, I feel helpless.

* *Notes.* scoring is reversed on these items. The Control Attitudes Scale-Revised is scored by adding the item scores, where each item is rated on a scale of from 1 (totally disagree) to 5 (totally agree). The total score can range from 8 to 40, with higher scores indicating greater perceived control.

A copy of this instrument, including the scoring can be found at the Editor's Web site at at http://www.nursing-research-editor.com

Table 3

Descriptive Statistics for Measures

Measure	# of Items	Mean (SD)			Possible Range			Actual Range		
		CHD	HF	MI	CHD	HF	MI	CHD	HF	MI
Control Attitudes Scale-Revised	8	30.3 (4.1)	28.4 (5.0)	29.1 (4.6)	8 – 40	8 – 40	8 – 40	13 – 40	8.4 – 40	11.4 –40
Brief Symptom Inventory, anxiety subscale	6	.60 (.68)	.86 (.75)	.64 (.76)	.00–4.00	.00–4.00	.00–4.00	.00–4.00	.00–3.50	.00–3.83
Brief Symptom Inventory, depression subscale	6		.98 (.88)			.00–4.00			.00–3.50	
Multiple Affect Adjective Checklist, anxiety	21	6.06 (4.14)			.00–21.00			.00–21.00		
Multiple Affect Adjective Checklist, depression	40	12.81 (6.58)			.00–40.00			.00–39.00		

Notes. CHD = coronary heart disease, HF = heart failure, MI = myocardial infarction;

Table 4

Corrected Item-Total Correlations for the Control Attitudes Scale-Revised

Items	Correlation		
	CHD	AMI	HF
1. If I do all the right things, I can successfully manage my heart condition.	.50	.46	.58
2. I can do a lot of things myself to cope with my heart condition.	.42	.48	.48
3. When I manage my personal life well, my heart condition does not bother me as much.	.41	.37	.45
4. I have considerable ability to control my symptoms.	.46	.45	.55
5. No matter what I do, or how hard I try, I just can't seem to get relief from my symptoms.	.37	.39	.34
6. I am coping effectively with my heart condition.	.43	.46	.45
7. Regarding my heart problems, I feel lots of control.	.44	.45	.49
8. Regarding my heart problems, I feel helpless.	.40	.42	.45

Notes. CHD = coronary heart disease, HF = heart failure, AMI = acute myocardial infarction

Table 5

Item Descriptive Statistics for the Control Attitudes Scale-Revised in the Coronary Heart Disease, Myocardial Infarction, and Heart Failure Patient Samples

Item** Number*	Item Mean (SD)			95% Confidence Intervals for the Mean		
	CHD	HF	MI	CHD	HF	MI
1	3.90 (.80)	3.81 (.97)	4.10 (.78)	3.87–3.92	3.85–3.97	4.00–4.20
2	4.13 (.66)	3.93 (.75)	4.20 (.66)	4.11–4.15	3.81–4.05	4.11–4.22
3	3.79 (.78)	3.51 (.99)	3.76 (.88)	3.76–3.81	3.35–3.68	3.68–3.83
4	3.56 (.88)	3.46 (.99)	3.68 (.92)	3.53–3.59	3.29–3.62	3.60–3.76
5	3.80 (.88)	3.47 (1.0)	3.51 (.96)	3.78–3.82	3.29–3.64	3.42–3.60
6	3.99 (.66)	3.81 (.75)	3.82 (.72)	3.97–4.02	3.68–3.93	3.76–3.88
7	3.41 (1.1)	3.10 (1.2)	2.97 (1.2)	3.37–3.44	2.89–3.27	2.86–3.07
8	3.70 (1.2)	3.26 (1.3)	3.13 (1.1)	3.66–3.74	3.04–3.48	3.01–3.25

* *Notes*. refer to Table 4 for actual items;

** possible range for each item is 1 to 5 and actual range for each item in all groups is 1–5; CHD = coronary heart disease, HF = heart failure, MI = myocardial infarction.

Table 6

Factor Loadings for the Control Attitudes Scale-Revised in the Coronary Heart Disease, Myocardial Infarction, and Heart Failure Patient Samples

Items	Factor 1		
	CHD	AMI	HF
1. If I do all the right things, I can successfully manage my heart condition.	.687	.644	.743
2. I can do a lot of things myself to cope with my heart condition.	.606	.650	.634
3. When I manage my personal life well, my heart condition does not bother me as much.	.595	.550	.634
4. I have considerable ability to control my symptoms.	.651	.628	.703
5. No matter what I do, or how hard I try, I just can't seem to get relief from my symptoms.	.522	.548	.464
6. I am coping effectively with my heart condition.	.591	.619	.600
7. Regarding my heart problems, I feel lots of control.	.577	.605	.620
8. Regarding my heart problems, I feel helpless.	.538	.559	.586

Notes. CHD = coronary artery disease, CAS-R = the Revised Control Attitudes Scale, HF = heart failure, AMI = acute myocardial infarction

Table 7

Summary of Multiple Regression Analysis of Variables Predicting Anxiety and Depression

Variable	B	SE B	β
Prediction of depression, CHD sample, R^2 = .147, p < .001 for the final model			
Perceived control	−.557	.026	−.346*
Age	−.050	.010	−.083*
Gender	1.104	.240	.078*
Education level	−.129	.035	−.038*
Marital status	−.109	.114	−.016
Hypertension	−.312	.221	−.023
Diabetes	.974	.266	.060*
Previous AMI	.168	.219	−.013
Prediction of anxiety, CHD sample, R^2 = .138, p < .001 for the final model			
Perceived control	−.309	.017	−.306*
Age	−.056	.006	−.150*
Gender	.847	.152	.095*
Education level	−.087	.038	−.038*
Marital status	−.033	.072	−.008
Hypertension	−.189	.140	−.023
Diabetes	.382	.168	.038*
Previous AMI	−.013	.138	−.002
Prediction of depression, HF sample, R^2 = .212, p < .001 for the final model			
Perceived control	−.059	.016	−.349*
Age	−.012	.006	−.178*
Gender	−.106	.155	−.062
Education level	−.012	.027	−.038
Marital status	−.045	.072	−.057
New York Heart Association functional class	.193	.127	.148
Left ventricular ejection fraction	.003	.005	.053
Total comorbidity load, Charlson comorbidity index	.115	.023	.036
Prediction of anxiety, HF sample, R^2 = .151, p < .01 for the final model			
Perceived control	−.033	.014	−.231*
Age	−.004	.005	−.077
Gender	−.097	.134	−.067
Education level	.013	.024	.051
Marital status	−.097	.063	−.146
New York Heart	.238	.110	.219*
Association functional class			
Left ventricular ejection fraction	.000	.005	−.013
Total comorbidity load, Charlson comorbidity index	.024	.002	.013

Variable	B	SE B	β
Prediction of anxiety, AMI sample, R^2 = 316., p < .001 for the final model			
Perceived control	−.041	.010	−.228*
Age	−.009	.003	−.154*
Gender	.127	.095	.077
Education level	−.029	.015	−.105
Marital status	−.022	.032	−.039
Left ventricular ejection fraction	.003	.003	.047
Diabetes	.108	.103	.059
Previous AMI	−.185	.097	−.105

* *Notes.* p < .05, CHD = coronary artery disease, HF = heart failure, AMI = acute myocardial infarction